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EXAMINER	
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2128	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/666,209	EVANS ET AL.	
	Examiner	Art Unit	
	Suzanne Lo	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _03 July 2007_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-20_ is/are pending in the application.

4a) Of the above claim(s) _15-18_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-14,19 and 20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _17 September 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _08/28/07_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-14 and 19-20 have been presented for examination. The Request for Continued Examination has been acknowledged.

Election/Restrictions

2. Applicant's election without traverse of claims 1-14 and 19-20 in the reply filed on 07/12/06 is acknowledged.

PRIORITY

3. Acknowledgment is made of applicant's claim for priority to provisional application 60/411,839 filed on 09/18/02.

Information Disclosure Statement

4. The information disclosure statements (IDS) submitted on 08/28/07 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner has considered the IDS as to the merits.

Claim Rejections - 35 USC § 102

5. **Claim 1-14 and 19-20 are rejected** under 35 U.S.C. 102(a) as being clearly anticipated by **Optimal Technologies ("Operations Review of June 14, 2000 PG&E Bay Area System Events Using Aempfast Software").**

As per claim 1, Optimal is directed to a method for simulating an electric power network having a plurality of transmission-level buses and connected electrical elements and a plurality of distribution-level buses and connected electrical elements, the method comprising: determining a model of the transmission-level buses and connected electrical elements, *the model of the transmission-level buses including a plurality of transmission lines and a plurality of transmission electrical elements* **(page 16, Section 4.2 and page 27, last paragraph)**; determining a model of the distribution-level buses and connected electrical elements, *the model of the distribution-level buses including a plurality of*

distribution lines and a plurality of distribution electrical element **(page 16, Section 4.2 and page 27, last paragraph)**; generating a single mathematical model by integrating the model of the transmission-level buses with the model of the distribution-level buses, wherein the single mathematical model further models the interdependency of the *plurality of transmission lines and the plurality of transmission electrical elements included in the model of the* transmission level buses and the *plurality of distribution lines and the plurality of distribution electrical elements included in the model of the* distribution-level buses **(page 13, Section 3, 5th paragraph)**; and simulating an operation of the electric power network with the single mathematical model **(page 13, Section 3, 5th paragraph)**; and *outputting* data describing the simulated electric power network **(page 21, Section 8)**.

As per claim 2, Optimal is directed to a method for analyzing an electric power network having a plurality of transmission-level buses and connected electrical elements and a plurality of distribution-level buses and connected electrical elements, the method comprising: determining a model of the transmission-level buses and connected electrical elements, *the model of the transmission-level buses including a plurality of transmission lines and a plurality of transmission electrical elements* **(page 16, Section 4.2 and page 27, last paragraph)**; determining a model of the distribution-level buses and connected electrical elements, *the model of the distribution-level buses including a plurality of distribution lines and a plurality of distribution electrical elements* **(page 16, Section 4.2 and page 27, last paragraph)**; generating a single mathematical model by integrating the model of the transmission-level buses with the model of the distribution-level buses, wherein the single mathematical model further models the interdependency of the *plurality of transmission lines and the plurality of transmission electrical elements included in the model of the* transmission level buses and *the plurality of distribution lines and the plurality of distribution electrical elements included in the model of the* distribution-level buses **(page 13, Section 3, 5th paragraph)**; simulating an operation of the electric power network with the single mathematical model **(page 13, Section 3, 5th paragraph)**; assessing under load flow analysis at

least one of a condition and performance of the simulated electric power network **(page 13, Section 3, 1st paragraph)** and *outputting* data describing at least one of the condition and the performance of the simulated electric power network **(page 21, Section 8)**.

As per claim 3, Optimal is directed to the method of claim 2, further comprising: integrating models of theoretical distribution-level real and reactive energy sources connected to one or more of the plurality of distribution-level buses into the single mathematical model **(page 13, Section 3, 1st paragraph)**; and observing impacts and effects across the simulated electric power network of the theoretical distribution-level real and reactive energy sources connected on one or more of the plurality of distribution-level buses **(page 13, Section 3, 2nd paragraph)**.

As per claim 4, Optimal is directed to the method of claim 2, further comprising: integrating models of theoretical alternative topologies of the distribution-level portion of the electrical power network into the single mathematical model **(page 13, Section 3, 5th paragraph)**; and observing impacts and effects across the simulated electrical power network of the alternative topologies of distribution-level portions of the network **(page 13, Section 3, 5th paragraph)**.

As per claim 5, Optimal is directed to the method of claim 2, further comprising: integrating additional models of theoretical distribution-level loads into the single mathematical model **(page 13, Section 3, 5th paragraph)**; and observing impacts and effects of load growth across the simulated electrical power network due to the addition of theoretical distribution-level loads **(page 13, Section 3, 5th paragraph)**.

As per claim 6, Optimal is directed to the method of claim 2, further comprising: integrating models of theoretical transmission-level real and reactive energy sources connected to one or more of the plurality of transmission-level buses into the single mathematical model **(page 13, Section 3, 1st and 5th paragraph)**; and observing impacts and effects across the simulated electric power network of the

theoretical transmission-level real and reactive energy sources connected on one or more of the plurality of transmission-level buses **(page 13, Section 3, 5th paragraph)**.

As per claim 7, Optimal is directed to the method of claim 2, further comprising: integrating models of theoretical alternative topologies of the transmission-level portions of the electrical power network into the single mathematical model **(page 13, Section 3, 5th paragraph)**; and observing impacts and effects across the simulated electrical power network of the alternative topologies of transmission-level portions of the network **(page 13, Section 3, 5th paragraph)**.

As per claim 8, Optimal is directed to the method of claim 2, further comprising: integrating additional models of theoretical transmission-level loads into the single mathematical model **(page 13, Section 3, 5th paragraph)**; and observing impacts and effects of load growth across the simulated electrical power network due to the addition of theoretical transmission-level loads **(page 13, Section 3, 5th paragraph and page 14, 2nd paragraph)**.

As per claim 9, Optimal is directed to the method of claim 2, wherein the integrating models further comprises: representing actual distribution-level buses and elements having an actual voltage and an actual topology with corresponding models of buses and elements characterized, at least in part, by representations of the actual voltages and the actual topologies of the distribution-level buses and elements **(page 13, Section 3, 2nd paragraph)**.

As per claim 10, Optimal is directed to a method for analyzing performance of a modeled electric power network having a plurality of transmission-level buses and connected electrical elements and a plurality of distribution-level buses and connected electrical elements, the method comprising: determining a model of the transmission-level buses and connected electrical elements, *the model of the transmission level buses including a plurality of transmission lines and a plurality of transmission electrical elements* **(page 16, Section 4.2 and page 27, last paragraph)**; determining a model of the distribution-level buses and connected electrical elements, *the model of the distribution level buses*

including a plurality of distribution lines and a plurality of distribution electrical elements **(page 16, Section 4.2 and page 27, last paragraph)**; generating a single mathematical model by integrating the model of the transmission-level buses with the model of the distribution-level buses, wherein the single mathematical model further models the interdependency of the *plurality of transmission lines and the plurality of transmission electrical elements included in the model of the* transmission level buses and the *plurality of distribution lines and the plurality of distribution electrical elements included in the model of the* distribution-level buses **(page 13, Section 3, 5th paragraph)**; assessing by load flow analysis a condition and a performance of the modeled electric power network **(page 15, Section 4.1.1)**; adding incremental real and reactive energy sources in locations of the modeled electric power network **(page 13, Section 3, 5th paragraph)**; assessing by load-flow analysis the condition and performance of the simulated electric power network with the added incremental real and reactive energy sources **(page 15, Section 4.1.1)**; determining whether the performance of the modeled electric power network is improved as a result of the added real and reactive energy sources **(page 16, Section 4.1.1)**; determining a set of added real and reactive energy sources that yields a greatest improvement in network performance **(page 13, Section 3, 5th paragraph)**; characterizing the set of added real and reactive energy sources as specific distributed energy resources **(page 13, Section 3, 5th paragraph)** and *outputting* data describing the set of added real and reactive energy resources **(page 21, Section 8)**.

As per claim 11, Optimal is directed to the method of claim 10, further comprising, quantifying an improvement in performance of the modeled electric power network due to the set of added real and reactive energy sources **(page 13, Section 3, 5th paragraph)**.

As per claim 12, Optimal is directed to the method of claim 10, wherein adding incremental real and reactive energy sources further comprises: representing the energy sources with models of the energy sources characterized, at least in part, by values of corresponding electric power network actual bus location and actual voltage level **(page 13, Section 3, 2nd paragraph)**; adding to the *single* mathematical

model the models of the energy sources at one of the distribution-level buses and transmission-level buses, wherein the models of real energy sources are added subject to actual limits appropriate for dispatchable demand reductions available on the electric power network, and the real energy sources with reactive energy sources are added subject to actual limits appropriate for generation at load sites within the electric power network **(page 13, Section 3, 5th paragraph)**.

As per claim 13, Optimal is directed to the method of claim 10, wherein determining whether the performance of the modeled electric network is improved as a result of the addition of energy sources comprises: considering selected characteristics of a reduction of real power losses and reactive power losses, improvement in voltage profile, improvement in voltage stability, improvement of load-serving capability, and avoidance of additions of electric elements connected to the network that would otherwise be required **(page 19-20, Section 6.1.2 and Section 6.2)**.

As per claim 14, Optimal is directed to the method of claim 10, wherein characterizing the additions of real and reactive energy sources comprises: creating a plurality of mathematical models each having both distribution-level buses and connected electrical elements and transmission-level buses and connected electrical elements under a plurality of network operating conditions **(page 15, Section 4.1.1)**; determining the additions of models of real and reactive energy sources that achieve the greatest improvement in network performance of the modeled network under each set of operating conditions **(page 13, Section 3, 5th paragraph)**; characterizing each incremental addition of real or reactive energy sources as a discrete generation project, dispatchable demand response project, or capacitor bank project **(page 13, Section 3, 5th paragraph)**; and comparing results achieved under each set of operating conditions to derive model profiles for operation of each discrete added energy source model under each different set of operating conditions **(page 19-20, Section 6.1.2 and Section 6.2)**.

As per claim 19, Optimal is directed to a computer readable medium comprising a computer program that when executed in a computer processor implements the steps of: determining a model of the

transmission-level buses and connected electrical elements, *the model of the transmission-level buses including a plurality of transmission lines an a plurality of transmission electrical elements* **(page 16, Section 4.2 and page 27, last paragraph)**; determining a model of the distribution-level buses and connected electrical elements, *the model of the distribution-level buses including a plurality of distribution lines and a plurality of distribution electrical elements* **(page 16, Section 4.2 and page 27, last paragraph)**; generating a single mathematical model by integrating the model of the transmission-level buses with the model of the distribution-level buses, wherein the single mathematical model further models the interdependency of the *plurality of transmission lines and the plurality of transmission electrical elements included in the model of the* transmission level buses and the *plurality of distribution lines and the plurality of distribution electrical elements included in the model of the* distribution-level buses **(page 13, Section 3, 5th paragraph)**; simulating an operation of the electric power network with the single mathematical model **(page 13, Section 3, 5th paragraph)**; assessing under load flow analysis at least one of a condition and performance of the simulated electric power network **(page 13, Section 3, 1st paragraph)** and *outputting* data describing at least one of the condition and the performance of the simulated electric power network **(page 21, Section 8)**.

As per claim 20, Optimal is directed to the computer readable medium of claim 19, further comprising a computer program that when executed in a computer processor further implements the steps of: integrating models of theoretical distribution-level sources of real and reactive energy sources connected to one or more of the plurality of distribution-level buses into the single mathematical model **(page 13, Section 3, 1st paragraph)**; and calculating impacts and effects across the simulated electric power network of the theoretical distribution-level real and reactive energy sources connected on one or more the plurality of distribution-level buses **(page 13, Section 3, 2nd paragraph)**.

Response to Arguments

6. Applicant's arguments filed 07/03/07 have been fully considered but they are not persuasive.

7. The 101 rejections have been withdrawn due to the amended claims.

8. The 102 rejection of claims 1-14 and 19-20 as anticipated by Optimal are maintained.

In response to Applicant's argument that Optimal does not disclose "a single mathematical model" that models the interdependency of transmission lines and elements in the transmission level model and distribution lines and elements in the distribution level model the Applicant is further directed to page 13, Section 3, 5th paragraph of Optimal which reads, "Aempfast also has been designed to analyze and optimize simultaneously for multiple competing system goals" such as the rankings that every bus on a system according to the amount of "stress" placed on them, their power quality an power flow, selecting a location for optimal placement, and the total elimination of all voltage violations on a system. Aempfast also ranks and indexes all buses together and all sources together from their system stability strength or weakness in the system – the comprehensive ranking cannot be calculated without all the components within a single model and the dependencies on them thus Optimal discloses a single mathematical model. Furthermore, nowhere does Optimal disclose or imply that the modeling method used in Aempfast consists of one that separately models transmission and distribution systems.

In response to Applicant's argument that Optimal does not disclose limitations in dependent claims 3-9, 11-14, and 20 regarding integrating models of additional energy sources to the single mathematical model, not only does Optimal disclose identifying loads that contribute to voltage collapse and ranking generators according to their output ability, Optimal also discloses "proper ranking of possible additions to system resources" (page 13, Section 3, 5th paragraph) as well as the ability of Aempfast to "size and place resources to improve" a mathematical system model and the addition of strategic resources performed in detail within another study (page 18, Section 4.3.4 "Optional Study Phase 4 – Further Bay Area System Improvements"). Not only does Optimal analyze and optimize

existing transmission and distribution busses and elements within a mathematical model, it also discloses incorporating additional elements into the mathematical model.

9. The 102 and 103 rejections of claims 1-14 and 19-20 in view of Rehtanz '175 in further view of Rehtanz '915 have been withdrawn due to the amended claims.

Conclusion

10. The prior art made of record is not relied upon because it is cumulative to the applied rejection. These references include:

1. "Scalable Multi-Agent System for Real-Time Electric Power Management" published by Tolbert et al. in 2001.

2. "Load Following Functions Using Distributed Energy Resources" published by Li et al. in 2000.

3. U.S. Patent No. 6,549,880 B1 issued to Willoughby et al. on 04/15/03.

4. U.S. Patent No. 6,885,915 B2 issued to Rehtanz et al. on 04/26/05

5. U.S. Patent No. 7,096,175 B2 issued to Rehtanz et al. on 08/22/06.

11. All Claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suzanne Lo whose telephone number is (571)272-5876. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571)272-2297. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Suzanne Lo
Patent Examiner
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SL
09/06/07

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